

*AUSTRALONUPHIS VIOLACEA*, A NEW POLYCHAETE  
(ONUPHIDAE) FROM THE SOUTHEAST  
PACIFIC OCEAN

N. Rozbaczylo and J. C. Castilla

*Abstract.*—A new species of *Australonuphis* Paxton, 1979, *A. violacea* from the southeast Pacific Ocean off Chile is described. This constitutes the second record of the genus *Australonuphis* along the west coast of America and the first for the southeast Pacific. The new species most closely resembles *A. casamiquelorum* (Orensanz, 1974) from the southwest Atlantic Ocean.

---

During 1971-1978 while working in a long term sandy macrofauna sampling (J. C. Castilla, principal investigator) several specimens of a big onuphid polychaete were collected in the sandy beach of Los Molles (32°15'S, 71°33'W). These specimens and others collected recently by 2 of our students (C. Luxoro and L. Sierralta) in another sandy beach of central Chile, Playa de Cachagua (32°35'S, 71°28'W), belong to a new species, described herein. The species is a member of the genus *Australonuphis* Paxton, which is recorded for the first time in the Chilean fauna. As a result of the present study, the number of onuphids known from the coast of Chile is now 14 species in 6 genera (Rozbaczylo, in preparation).

The generic name *Australonuphis* was recently proposed by Paxton (1979) as a substitute for *Americanuphis* Orensanz (1974) since the latter was preoccupied by *Americanuphis* Fauchald, 1973.

*Australonuphis* Paxton (1979) and *Americanuphis* Fauchald (1973), together with *Paranorthia* Moore (1903) and *Rhamphobrachium* Ehlers (1887), form a group that includes species with 2 or more anterior setigers with prolonged parapodia and armed with special setae. While *Paranorthia* and *Rhamphobrachium* includes species that have the first 2 or 3 anterior segments with enlarged parapodia, *Australonuphis* and *Americanuphis* includes macropodous onuphids with the anterior 5-7 parapodia greatly enlarged. These 2 genera can be easily distinguished from each other by the direction of parapodia of the 5 anterior setigers, the distinctive kinds of setae in these setigers and the presence or absence of a digital process at the base of dorsal cirri in parapodia of postmodified setigers. In *Americanuphis* parapodia of modified segments are directed anteroventrally and provided with compound or pseudocompound bidentate hooded hooks and dorsal cirri without basal appendages, whereas *Australonuphis* has parapodia

of anterior setigers directed anterolaterally and armed with long, distally curved pseudocompound hooks, and behind the modified setigers with a digital process at the base of dorsal cirri.

Type-material and additional specimens of the new species have been deposited in the collections of the following institutions: Museo Nacional de Historia Natural, Santiago (MNHN); Sala de Sistemática, Laboratorio de Zoología, Pontificia Universidad Católica de Chile, Santiago (SSUC); National Museum of Natural History, Smithsonian Institution, Washington (USNM).

*Australonuphis* Paxton, 1979

*Type-species.*—*Americanuphis casamiquelorum* Orensanz, 1974, by original designation.

*Diagnosis.*—Onuphids with the anterior 5–7 parapodia greatly enlarged and directed anterolaterally and armed with pseudocompound hooks, with or without minute subdistal spine. More posterior parapodia are dorsolateral in position and have limbate setae, with or without weak pseudoarticulation, pectinate setae from setigers 6–7 and entire subacicular hooks, starting relatively far posteriorly (setiger 50–75). Prostomium with 2 ovate frontal antennae, a pair of globular ventral palps and 5 occipital antennae with ringed ceratophores and relatively short ceratostyles. Peristomium with a pair of short tentacular cirri. Branchiae begin on setiger 6–7 with 1 to 3 filaments pectinately arranged above the dorsal cirri to a maximum of 7 filaments where the branchiae are best developed. Dorsal cirri with basal swelling from setiger 6–7, developing gradually into digitate basal process. Anterior ventral cirri subulate and replaced by ventrolateral thick pads by setigers 11–24. The proboscidian armature is well developed and resembles that of other onuphids.

*Australonuphis* Paxton, includes the following species:

- A. casamiquelorum* (Orensanz), 1974:100–104, pl. 9, figs. 1–14. From Cas-sino (Rio Grande do Sul, Brasil) to Caleta de los Loros (Golfo San Matías, Argentina), in sandy bottoms, between the lower mid-littoral zone down to 14 m.
- A. hartmanae* (Friedrich), 1956:63–65, fig. 5a–c. Playa de las Flores, El Salvador, in an intertidal sandy beach.
- A. parateres* Paxton, 1979:273–277, figs. 2, 3, 9–18. Southern to eastern Australia, from Adelaide, South Australia, to Yeppoon, Queensland, in surf beaches.
- A. teres* (Ehlers), 1868:293–295. Eastern Australia, from Lakes Entrance, Victoria, to Maroochydore, Queensland, in surf beaches.
- A. violacea* n. sp. Central Chile, from Playa de Pichidangui (32°06'S) to Playa de Cachagua (32°35'S), in intertidal and subtidal sandy beaches.



*Australonuphis violacea*, new species

Figs. 1–3

*Diagnosis.*—Large and fleshy species; total length unknown but over 20 cm long and more than 350 setigers. The anterior 6–7 segments are characteristically blue-violet pigmented. The first 5 pairs of parapodia greatly enlarged and directed anterolaterally, and provided with 4–5 long and stout, distally curved pseudocompound hooks, with or without a small subdistal spur; following parapodia are dorsolateral in position. Branchiae first present from setiger 6 with 2 or 3 filaments in pectinate arrangement; the maximum number of branchial filaments is 7 at setiger 9–13. Limbate setae from setiger 6. Pectinate setae are present from setiger 6 or 7, each has about 15 teeth. Subacicular hooks, one per parapodium, from setiger 60; after setiger 75–80 they occur 2 in a parapodium. Cutting plates of mandibles are oval, with calcified cutting edge with an indentation. Maxillary formula: MI = falcate; MII = 7 + 7; MIII = 7 + 0; MIV = 7 – 8 + 8; MV = 1 + 1.

*Material.*—Central Chile: Los Molles, 32°15'S, 71°33'W, May 1978, M. Sánchez, coll., holotype (MNHN 80007); Los Molles, March 1976, O. Mena, coll., paratype (MNHN 80008); Los Molles, May 1975, E. González, coll., 2 specimens (SSUC 5593); Los Molles, November 1971, R. Becerra, coll., 3 specimens (SSUC 5592); Playa de Pichidangui, 32°06'S, 71°33'W, January 1962, P. Sánchez, coll., 1 specimen (SSUC 230-1); Playa de Cachagua, 32°35'S, 71°28'W, February 1979, C. Luxoro and L. Sierralta, coll., 1 specimen (SSUC 5596); Playa de Cachagua, April 1979, L. Sierralta, coll., 2 specimens (SSUC 5597); Playa de Cachagua, May 1979, L. Sierralta, coll., 1 specimen (USNM 67041).

*Description.*—All specimens are incomplete; the largest (paratype MNHN 80008) has 352 setigers and is 220 mm long and 9 mm wide. Holotype has 72 setigers and is 70 mm long and 8.5 mm wide.

Body large, robust, circular in cross-section anteriorly and somewhat depressed posteriorly. All individuals are marked with a characteristic brilliantly iridescent dark blue-violet color, involving the anterior 6–7 segments; the color persists in alcohol. The anterior region (Figs. 1a, b) is greatly modified and broader than the rest of the body, with the first 5 parapodia notably thicker and larger (Figs. 2a, b) than the other. The anterior segments are much longer than those farther back, they are strongly convex above and somewhat swollen at the front edge, with deep segmental furrows dorsally and ventrally; following segments are short and closely crowded, less convex above, nearly flat and with only a slight constriction between them on the ventral surfaces. Parapodia of the first 5 setigers are characteristically anterolaterally directed; parapodia 6 and 7 are transitional; the remainder of the parapodia are characteristically dorsolateral in position.

Peristomium and the first 6–7 setigers are entirely dark blue-violet colored with the exception of the styles of the occipital antennae, the peristomial

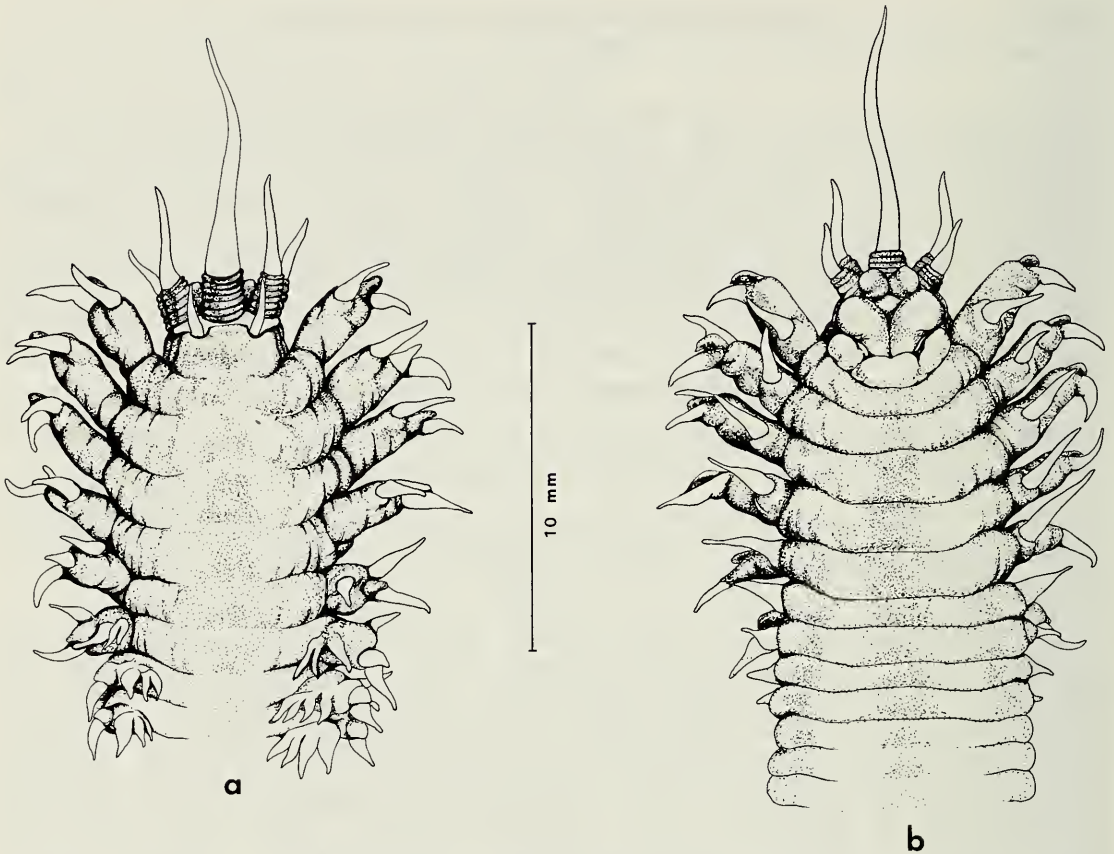


Fig. 1. *Australonuphis violaceus*: a, Anterior end, dorsal view; b, Anterior end, ventral view.

cirri, ventrolateral surface of palps, dorsal and ventral cirri and postsetal lobes which are yellow cream colored as is the rest of the body.

The prostomium (Fig. 1a) is small, nearly hidden by the bases of the antennae; it bears 2 ovate frontal antennae and 5 short occipital antennae with ringed ceratophores and tapering styles. There are no eyes. Ventrally in front of the mouth (Fig. 1b) there is a pair of thick, globular labial palps that are basally fused and deeply divided distally; the palpal bases overlie the oral aperture, while the anterior edge of the peristomium forms a swollen and wrinkled lower lip. The 3 dorsal occipital antennae are longer than the 2 lateroventral ones. The median unpaired one is the longest and, turned backwards, reaches setiger 4. The styles of the inner lateral pair are about twice the length of the outer lateral ones and about half the length of the median one. The ceratophores of the 3 dorsal occipital antennae are yellowish brown, whereas the ceratophores of the outer lateral antennae have the same blue-violet color as the first segments. Each of the outer lateral ceratophores has 6–8 annulations; each of the inner lateral ceratophores has 7–10 annulations; the median ceratophore has 8–10 annulations; in all ceratophores the distalmost annulation is a little longer than the others.



Fig. 2. *Australonuphis violaceus*: a, First parapodium, posterior view; b, Parapodium 3, posterior view; c, Parapodium 6; d, Parapodium 17; e, Parapodium 50.



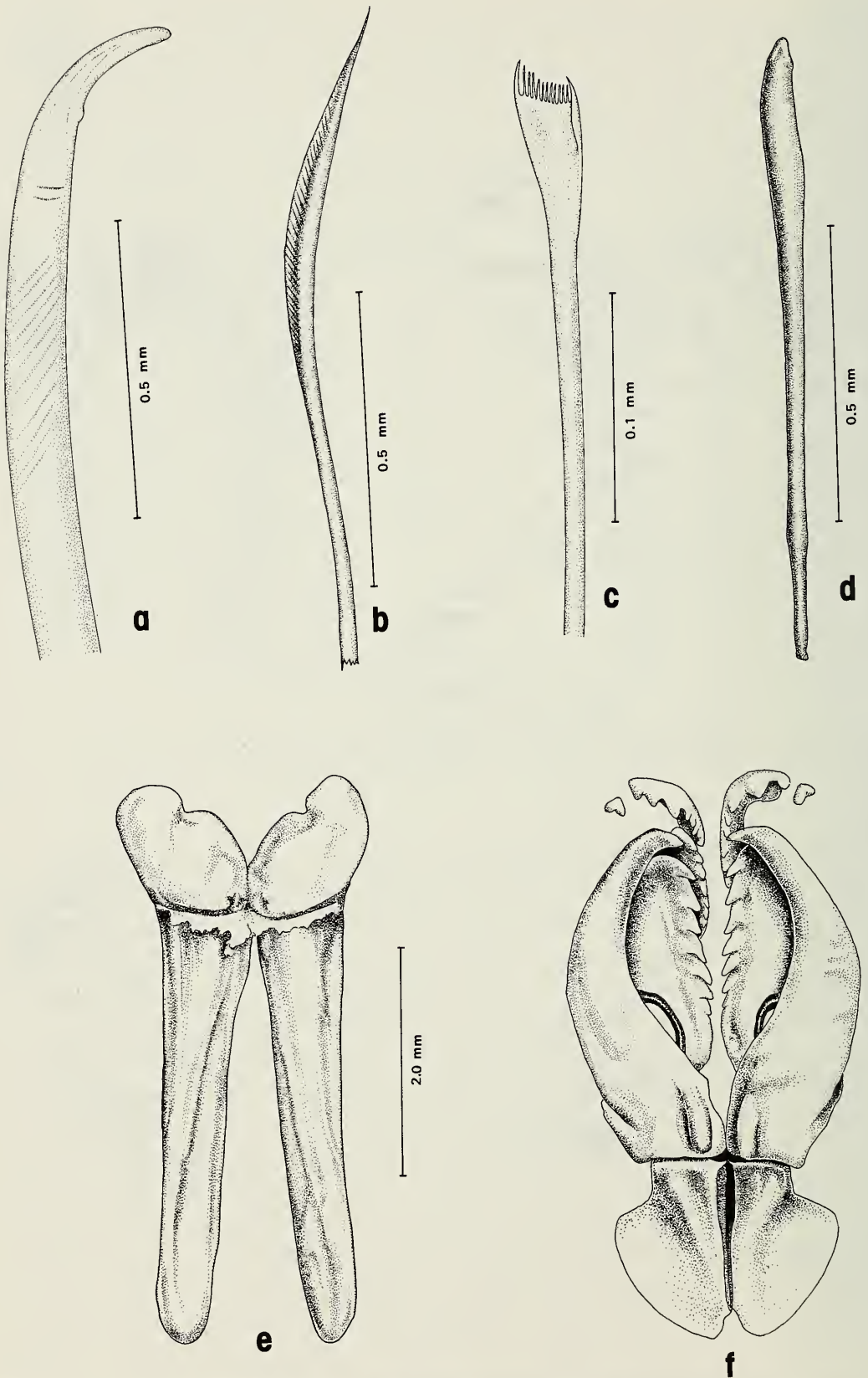


Fig. 3. *Australonuphis violaceus*: a, Pseudocompound hook from parapodium 3; b, Limbate notoseta, middle parapodium; c, Pectinate seta, middle parapodium; d, Subacicular hook from setiger 100; e, Mandibles; f, Maxillae.

The peristomium is about as long as the second setigerous ring at its middorsum and a little longer than the first one, and bears on its anterior margin a pair of smooth and tapering tentacular cirri which are as long as the peristomium.

Parapodia of 5 anterior setigers (Figs. 2a, b) are greatly enlarged, stout, and directed anterolaterally; maximal development is reached in the second parapodium. All first 5 parapodia are basically similar in structure. The dorsal and ventral cirri and the postsetal lobes are long and all similar to one another; presetal lobe large and subrectangular to oval, demarcated basally by a transverse fold joined to the base of the postsetal lobe. From the sixth setiger the parapodia are gradually dorsolateral in position. The dorsal cirrus is simple and cirriform on the first 5 setigers. From setiger 6 it has a branchia on its dorsal edge. The branchiae have at first 2 or 3 filaments in pectinate arrangement (Fig. 2c); farther back the branchiae increase in size and number of pinnae (Fig. 2d). Where best developed, from setiger 9–13 for the next 10–15 setigers, the number of branchial filaments is 6 or 7; then the number of branchial filaments diminishes to 5 or 6 and are continued far back. Occasionally 4 filaments can be found in some posterior segments. In the longest individual (posteriorly incomplete), consisting of 352 setigers, the branchiae still are present on the last setiger, and have 6 filaments. In general, the number of branchial filaments in median and posterior setigers vary erratically along the body and even within the parapodia of the same segment.

From setiger 7 the dorsal cirrus is basally swollen eventually developing a short digitate basal appendix, curved towards lateral sides of the body. The appendix increases in size posteriorly (Fig. 2e). The dorsal cirri gradually became broader and subcordiform in anteromedian segments. In posterior segments they decrease in size, so that in the last segments present they appear as a lateral appendix of the branchial trunk. Furthermore, from setiger 7 a more or less cirriform appendix appears next to the base of the dorsal cirrus. From approximately parapodia 12 to 15 this appendix gradually becomes a rounded lobe. At about parapodia 40 this lobe moves ventrally fusing with the presetal lobe and the thick ventrolateral pads, resulting in a presetal lip. The presetal lobe is large in the first segments, and gradually reduced from setiger 7, and by setigers 65–70 it is completely replaced by the new presetal lip.

Postsetal lobes are nearly triangular; they are slightly shorter than the ventral cirri in the anterior segments; farther back they gradually decrease in length, but retain their triangular form along the body.

Ventral parapodial cirri are subulate. They are large in the first segments, diminishing in length from setiger 8; they are absent after setigers 17–25. While the ventral cirri are diminishing in length, thick pads develop in their bases in the ventrolateral zone of the segments.

The first 5 setigers are armed with 4–5 stout, distally curved pseudocom-



pound hooks (Fig. 3a), amber-colored (in some cases 1 or 2 small recently formed hooks appear ventrally), and 1 or 2 simple superior setae. A subdistal spur may be present on the concave margin of the hooks.

The next following setigers have numerous slightly limbate setae (Fig. 3b), in 2 fascicles; those in the superior fascicles are longer and more slender than the inferior ones. Pectinate setae (Fig. 3c), each with about 15 teeth, are present from setiger 6 or 7 to the last one (parapodium 352 in the longest incomplete specimen), and number 3 or 4 in a fascicle.

Distally entire subacicular hooks (Fig. 3d) are first present from about setiger 60. They occur at first singly in a parapodium; from setiger 75–80 on they occur 2 to a parapodium.

In some of the preserved animals the distal ends of the mandibles project from the mouth.

Mandibles and maxillae (Figs 3e, f) of 2 specimens have been examined. The proboscicial armature (seen in dissection from Paratype SSUC 230-1 and drawn after removal from Paratype MNHN) is well developed. The mandibles are a little longer than the maxillary carriers and forceps together. The mandibular bases are free from one another for nearly their entire length. The distal plates of the mandibles are oval, calcified, and have an indentation in the cutting edge. Maxillae I are falcate; maxillae II have 7 teeth on either side; maxilla III, present on the left side only, has 7 teeth; maxilla IV has 7–8 left and 8 right; maxilla V on either side is a single tooth.

The tube is fragile, soft and cylindrical. It consists of a thin transparent parchmentlike base covered on the outside with a thin layer of fine sand grains. The tube becomes flattened without the worm. The soft and fragile tubes formed by *A. violaceus* appear to be only temporary.

*Etymology*.—The specific name is derived from the Latin and refers to the characteristic blue-violet pigmentation on the anterior 6–7 segments.

*Type-locality*.—Central Chile: Los Molles sandy beach (32°15'S, 71°33'W), at the lower midlittoral zone.

*Distribution*.—*Australonuphis violacea* is found in sandy beaches from Playa de Pichidangui (32°06'S) to Playa de Cachagua (32°35'S), between the low midlittoral zone and the infralittoral zone.

*Relationships*.—*Australonuphis violacea* resembles *A. casamiquelorum* in many respects, but differs at least in the following features: color pattern, number of branchial filaments, distribution of ventral cirri and subacicular hooks, the shape of the pseudocompound hooks, the number of teeth on the jaw-pieces. In *A. casamiquelorum* the anterior halves of the first 4–5 segments, including the peristomium, are slightly grayish-green colored, while in *A. violacea* the peristomium and the first 6–7 segments are entirely dark blue-violet colored. The number of branchial filaments is up to 4 in *A. casamiquelorum* and up to 7 in *A. violacea*. Ventral parapodial cirri are cirriform to setiger 10–16 in *A. casamiquelorum*, while in *A. violacea* they



reach setiger 24. Subacicular hooks usually first present from setiger 50–56 may even be present from setiger 25–26 in *A. casamiquelorum*, in *A. violacea* they are first present from about setiger 60. In *A. casamiquelorum* the pseudocompound hooks of anterior setigers are pointed and are only slightly curved distal to the spur; in *A. violacea* the hooks are distinctly curved and distally blunt. In the former species, the pseudocompound hooks have a subdistal articulation that involves the whole seta, while in the latter there is a subdistal pseudoarticulation that involve only half of the seta at the internal margin. The number of teeth on the jaw-pieces of *A. violacea* is greater than in *A. casamiquelorum*.

*Australonuphis casamiquelorum* is known from the south western Atlantic Ocean (Rio Grande do Sul, Brasil to Golfo San Matías, Argentina), while *A. violacea* is known from the south eastern Pacific Ocean in the central part of Chile.

*Ecological remarks.*—All the specimens of *A. violacea* obtained in Los Molles sandy beach were collected from the Lower Fringe of the beach (Sánchez *et al.*, in press). Other species characteristic of this Fringe are: the polychaete *Nephtys impressa*, the mole crab *Emerita analoga*, and juveniles of the bivalve *Mesodesma donacium*. In free diving observations at the same beach in 1972 a dense population of *A. violacea* was found beyond the surf zone at 4–5 m of depth (it was not possible to carry out observations in the surf area). Up to 10–15 individuals per m<sup>2</sup> were counted. *A. violacea* is easily identified subtidally due to the characteristic blue-violet pigmentation of the anterior segments, which the individuals usually stretch out of their tubes.

### Acknowledgments

Our thanks are due to Dr. Kristian Fauchald of the National Museum of Natural History, Smithsonian Institution for providing facilities during the visit that the first author made to the Allan Hancock Foundation (AHF), University of Southern California, in September 1977, and for many helpful suggestions while reviewing the manuscript. The first author is thankful also to the Catholic University and the Natural History Museum of Los Angeles County whose provisions of funds made possible to visit the AHF and start preparing the description of this species. We are grateful also to Erika von Chrismar for typing the manuscript and to Andrés Jullian for the art work.

### Literature Cited

- Ehlers, E. 1887. Report on the annelids of the dredging expedition of the U.S. Coast Survey Steamer BLAKE.—Memoirs of the Museum of Comparative Zoology at Harvard College 15:1–335, 60 pls.
- Fauchald, K. 1973. Polychaetes from Central American sandy beaches.—Bulletin of the Southern California Academy of Sciences 72:19–31.

- Friedrich, H. 1956. Mitteilungen über neue und wenig bekannte Polychaeten aus Mittel- und Südamerika.—*Senckenbergiana Biologica* 37:57–68.
- Moore, J. P. 1903. Polychaeta from the coastal slope of Japan and from Kamchatka and Bering Sea.—*Proceedings of the Academy of Natural Sciences of Philadelphia* 55:401–490, pls. 23–27.
- Orensanz, J. M. 1974. Los anélidos poliuetos de la provincia biogeográfica Argentina. V. Onuphidae.—*Physis, sec. A*, 33(86):75–122.
- Paxton, H. 1979. Taxonomy and aspects of the life history of Australian beachworms (Polychaeta: Onuphidae).—*Australian Journal of Marine and Freshwater Research* 30:265–294.
- Rozbaczylo, N. Anélidos Poliuetos de Chile. Catálogo Sistemático y Distribución Geográfica de las Especies (in preparation).
- Sánchez, M., Castilla, J. C., and Mena, O. Variaciones Verano-Invierno de la macrofauna de arena en playa Morrillos (Norte Chico, Chile).—*Studies on Neotropical Fauna and Environment* (in press).

Laboratorio de Zoología, Instituto de Ciencias Biológicas, Pontificia Universidad Católica de Chile, Casilla 114-D, Santiago, Chile.